Systems and Principles Unit Syllabus

Level 3 Systems architecture

7540-041

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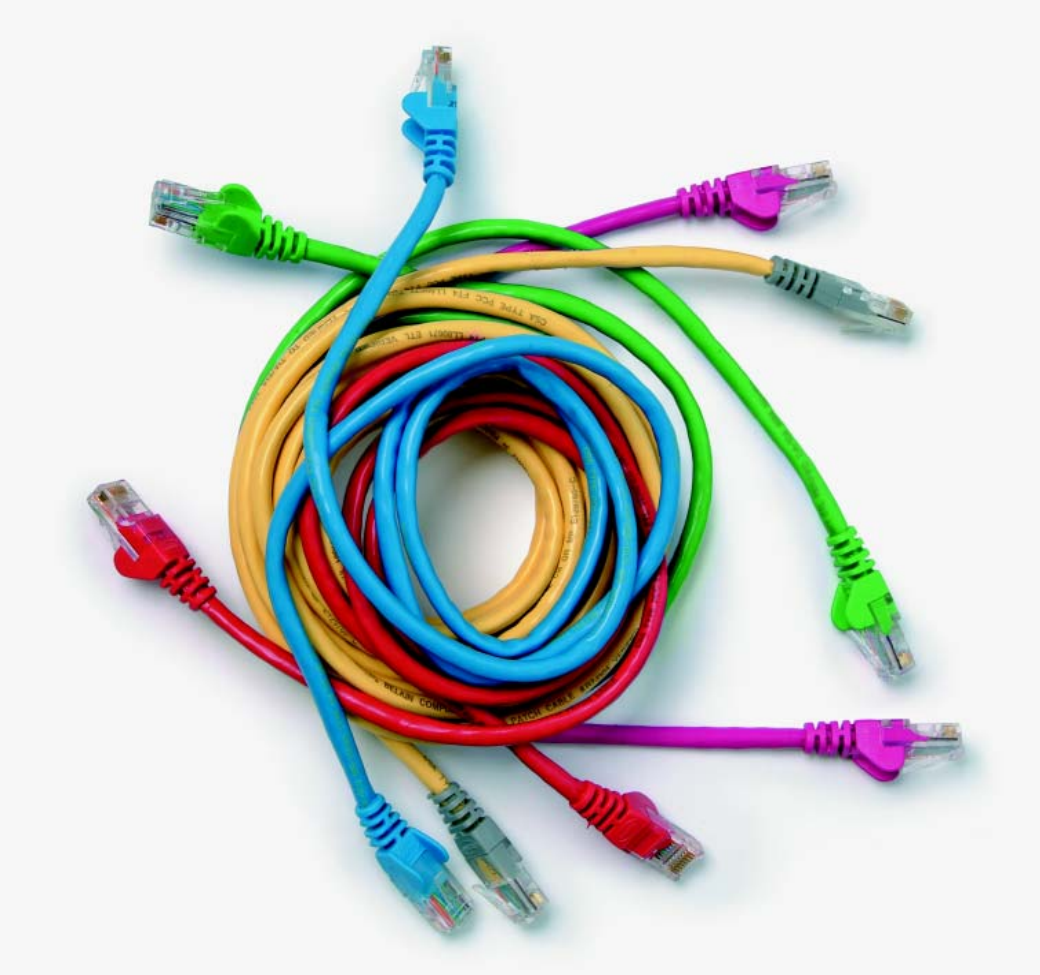
December 2010
Version 2.0



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Unit 041 Systems architecture

Syllabus Overview

Unit accreditation number **T/601/3504**

Credit value **10**

Rationale

This unit covers how information is represented and processed in a computer, communication processes in networks and distributed systems and distributed applications and transaction processing. It also involves knowledge and use of an operating environment.

Learning outcomes

There are **four** outcomes to this unit. The candidate will:

- Understand the representation of information within a computer and the way it is processed
- Make effective use of the operating environment of current computer systems
- Know the communication process in distributed operating systems and computer networks
- Know distributed applications and transaction processing in mainframe systems

Guided learning hours

It is recommended that **80** guided learning hours should be allocated for this unit. This may be on a full time or part time basis.

Connections with other qualifications

This unit contributes towards the learning outcomes and assessment criteria required for the level 3 Diploma in ICT Professional Competence.

Assessment and grading

Assessment will be by means of a **set assignment** covering practical activities and underpinning knowledge.

Unit 041 Systems architecture

Outcome 1 Understand the representation of information within a computer and the way it is processed

Underpinning knowledge

The learner will be able to

1 describe how number systems and data representation are used to store information in a computer:
   a binary
   b hexadecimal
   c ASCII
   d EBCDIC

2 describe the role of input, output and storage devices:
   a keyboard
   b scanner
   c monitor
   d printer
   e disk drive
   f CD-ROM drive
   g CD-RW drive
   h DVD drive

3 describe the characteristics of Central Processing Unit (CPU) components (Arithmetic and Logic Unit (ALU), Control Unit and Registers) and the operation of the Fetch Execute Cycle

4 describe the operation of a peripheral device using correct technical terminology:
   a keyboard
   b scanner
   c monitor
   d printer (laser, ink-jet)
   e disk drive.

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Outcome 2 Make effective use of the operating environment of current computer systems

Practical activities

The learner will be able to

1 use and configure operating system interfaces and functions eg
- a text editor
- b file/directory management (copy, delete, rename)
- c system tools eg backup, restore, defragmenter
- d user interface eg command language, graphical user interface (GUI).

Underpinning knowledge

The learner will be able to

1 explain the role of process management and concurrent processes in computer operating systems
- a multiprogramming/multitasking
  - i resources allocation and scheduling
  - ii memory management techniques
  - iii file management (directory structure, file structure, file access control, methods of storage)
  - iv input and output control
  - v storage protection methods
  - vi deadlock

2 describe how operating system features can contribute to data and system security eg passwords, access rights, firewall.

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Outcome 3 Know the communication process in distributed operating systems and computer networks

Underpinning knowledge

The learner will be able to

1 outline the function and operation of distributed operating systems
   a control of multiple sites
   b user access of multiple sites
   c connection of PC, Unix, mainframe and other systems
   d client/server model
   e use and format of Structured Query Language (SQL)

2 outline the functions of data communications systems in enabling network and distributed systems eg high performance, reliable, robust, secure, scaleability
   a TCP/IP
   b separate communications server.

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Outcome 4 Know distributed applications and transaction processing in mainframe systems

Underpinning knowledge

The candidate will be able to

1 outline the operation and functions of mainframe systems eg speed, processing power, storage capacity and transaction processing including COMMIT or ROLLBACK

2 outline the evolution of and characteristics of distributed applications

3 outline data and process distribution eg
- a data replication
- b propagation to all replicas
- c data fragmentation
- d local processing of local, replicated or downloaded data
- e overheads of locking for concurrent access
- f query optimisation.

Unit record sheet

Use this form to track your progress through this unit.

Tick the boxes when you have covered each outcome. When they are all ticked, you are ready to be assessed.

Outcome	✓	Date
1 Understand the representation of information within a computer and the way it is processed	☐	
2 Make effective use of the operating environment of current computer systems	☐	
3 Know the communication process in distributed operating systems and computer networks	☐	
4 Know distributed applications and transaction processing in mainframe systems	☐	

Candidate Signature ..... **Date** .....

City & Guilds Registration Number .....

Quality nominee (if sampled) ..... **Date** .....

Assessor Signature ..... **Date** .....

External Verifier Signature (if sampled) ..... **Date** .....

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